

David John CHATTING, *et al.*
Serial No. 10/585,785
June 11, 2009

REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested.

In response to the Examiner's rejection of claims 2-8 and 19-22 under 35 U.S.C. §101 as allegedly not reciting statutory categories of invention, these claims have been amended above so as to more specifically "tie" the claimed subject matter to another statutory category (i.e., a particular apparatus).

In addition, as those in the art readily appreciate, an operable programmed computer system necessarily transforms underlying subject matter (e.g., such as magnetizable materials, doped semi-conductor materials, etc.) to a different state. Indeed, computers have traditionally been referred to as "state machines" for precisely this reason. At each clock cycle, a multitude of different physical states of physical material must necessarily be achieved, or else the computer is a useless lump of coal. To assert otherwise would not be intellectually honest.

Furthermore, even prior to the amendment, those having skill in the relevant art would understand that the recited steps could not practically be performed manually without the use of a particular thing or product of any statutory class.

In any event, with the above amendments, surely this ground of rejection has now been overcome.

David John CHATTING, *et al.*
Serial No. 10/585,785
June 11, 2009

In response to the rejection of claims 20 and 22 under 35 U.S.C. §112, 1st paragraph, these claims have been amended above so as to more directly correspond to the original written description – by now reciting time from receipt of the new first facial image instead of the number of persons included in the group.

Accordingly, this ground of rejection is also believed to have now been overcome.

The rejection of claims 2-10 and 12-23 under 35 U.S.C. §103 as allegedly being made “obvious” based on Fujiwara¹ in view of Fujiwara² is respectfully traversed.

Fujiwara¹ teaches a system wherein any given single visitor can input a facial image P, then select a desired mean face S from among a library of mean faces to produce a caricature image Q. It appears that Fujiwara¹ concludes that better caricatures result if the selected mean facial image is from a similar gender, age, racial group, etc., as the input image. Thus, in the final paragraph on page 156, Fujiwara¹ proposes an algorithm for automatically selecting a mean face in such a way that the attributes vector A(s) of the selected mean face S is closest to that of the attributes vector for the visitor P. See also equation 2 and the remainder of Fujiwara¹.

Contrary to the Examiner’s assertions, Fujiwara¹ does not appear to teach storage of caricatured image representations of plural subjects. The Examiner relies upon page 154, section 3.1, but this does not support the Examiner’s assertion. Indeed,

David John CHATting, *et al.*
Serial No. 10/585,785
June 11, 2009

it appears that each visitor has an individual experience with the website and the various available mean faces that might be selected for use in caricature of a single input image P.

If the Examiner believes that there is some teaching in Fujiwara¹ of storing multiple caricature images Q for a particular grouping of visitors P, then the Examiner is respectfully requested to particularly point out where there is any such teaching – or suggestion.

The Examiner's recognition of certain deficiencies in Fujiwara¹ are appreciated. However, the Examiner's discussion even of these admitted deficiencies indicates some apparent misunderstanding of the Fujiwara¹ teaching. For example, Fujiwara¹ does not suggest creating a new caricature Q based on "the" mean face S, but instead explicitly teaches that the visitor may choose among different mean faces S so as to better match the attribute vector of the input image P with the attribute vector of the particular selected mean face S that is to be used for caricaturing purposes.

To supply the admitted deficiencies in Fujiwara¹, the Examiner relies upon Fujiwara². However, Fujiwara² actually builds upon the basic idea of Fujiwara¹ by teaching more details concerning the attribute matrix that is to be compiled for a given average or mean face based on the averaging of many input faces. The general teaching of Fujiwara² appears to be that the more input faces used for the average mean face and its associated attribute matrix, the better. For example, the experiment

David John CHATTING, *et al.*
Serial No. 10/585,785
June 11, 2009

described at pages 563 *et seq.* apparently uses a facial database of 300 images, one-half of which are male faces and one-half of which are female faces. Furthermore, the database is originally collected for each five-year interval from ages 15-64. For each gender class, five attribute matrices were built for each age interval. Once again, as in Fujiwara¹, Fujiwara² teaches that one should use the best mean face associated with the best-matched attributes matrix and the input face to be caricatured. As explained as section 4.2 of Fujiwara², one underlying theory is that the exaggerated caricature features should be based on the individual characteristics of the input face – and not on attributes such as those defined by the attribute matrix. In particular, Fujiwara² explicitly teaches the best-matched mean face is to be selected as the one suitable for generating a facial caricature from an input image.

At section 4.3 on page 564, Fujiwara² explicitly teaches “we also developed special attribute matrices so that that the input faces are not included [in] the attribute matrices.” Thus, both Fujiwara¹ and Fujiwara² specifically teach against including data from the input face to be caricatured to the average or mean image to be compared thereagainst for the purposes of caricature.

It appears that the Examiner has overlooked some of these explicit teachings of the Fujiwara references when alleging that it would have been “obvious...to modify the Fujiwara¹'s system to include the new input image, P, into the mean face, S...” The Examiner alleges that one of ordinary skill in the art would have been motivated to do so

David John CHATTING, *et al.*
Serial No. 10/585,785
June 11, 2009

“because this would provide the most up-to-date mean face.” Of course, that is entirely contrary to the explicit teaching of both of these references – neither of which deals with providing a mean face that is the most “up-to-date” (whatever that means in the context of Fujiwara).

The Examiner further alleges that it would have been “obvious” to make such a modification in Fujiwara¹ because one could thereby “achieve a predictable result of updating caricature information of each user in the system when a new mean face is obtained...” However, once again, this is directly contrary to the explicit teachings of both Fujiwara references. Indeed, to the extent that either reference teaches a “predictable result,” it does not come at all from updating any stored caricature information for each user in a system. Instead, it comes from storing attribute matrices that permit each new visitor to choose as the best-matched mean face S, one that has an attribute matrix vector most closely associated with the new input image P – but without actually utilizing the input image P in any way to derive any of the various available mean faces S or attribute matrices associated therewith.

The Examiner’s attempt to also rely upon “common sense” as a reason for motivation to make the Examiner’s suggested change is also without basis. The Examiner alleges that one of only ordinary skill in the art, and presumably without any hindsight at all, “would also realize that the caricature information for each user is out-of-date when a new mean face is obtained...” Of course, this is also directly contrary to

David John CHATting, *et al.*
Serial No. 10/585,785
June 11, 2009

the Fujiwara teachings which do not even teach the storage of caricatured information for each user. Accordingly, there is really no concept of the caricature information or a given user being "out-of-date." Nor is there any concept in the Fujiwara references of obtaining a new mean face each time a new visitor visits the website to create caricatures. To the contrary, the teaching of Fujiwara is that the library of previously acquired mean faces and their associated attribute matrices would be based upon a prior acquired image database.

Embodiments of the present invention generate caricatured image representations for each of a group of images by first generating a mean image based on the non-caricatured images in the group. Then that mean image is used in a caricaturing process to generate caricatured image representations of each member of the group (see page 9, line 13 to page 10, line 11). The aim is to generate caricatured image representations that are maximally distinguishable from each other. When a new image is presented to the group, a new mean image is generated based on the new image and the previously existing images in the group. An updated set of caricatured image representations of the existing images in the group and the new image are then generated using the new mean image. If someone leaves the group, then a new set of caricatures is also generated – now at least partially discounting dependence (i.e., of the mean image used for caricature) upon images of those leaving the group.

Specifically, claim 12 requires “processing means arranged in use to generate a caricatured image representation of the new subject and replacement caricatured image representations of the subjects in dependence on the stored image representations thereof and the received image representation of the new subject.” Thus, caricatured image representations of both the stored subjects and the input image are generated, and the generation is based on the stored image representations and the received image. The discussion below highlights how this differs from the interpretation of the prior art upon which the Examiner relies.

The deficiencies identified by the Examiner in Fujiwara¹ are incomplete – and, in any event, are not supplied by Fujiwara².

Fujiwara² teaches use of an attribute matrix (AM) to represent a face image (see page 560), so that both an input face P and a mean face S can be represented by respective attribute matrices. Fujiwara² teaches generating ten mean face AMs, each representative of an age range and gender of a person (see Fig. 7 and section 4.1), and which are based on faces taken from a facial database (section 4.1). Thus, when an input face P is provided, an algorithm (equation 8) is used to determine the best-matched AM and corresponding mean face from this predetermined set of ten AMs and associated mean faces (see section 4.2) for use in a caricaturing process.

While Fujiwara² teaches calculating mean faces based on a number of test faces from a database (section 4.1), it does not suggest in any way modifying the set of mean

David John CHATting, *et al.*
Serial No. 10/585,785
June 11, 2009

faces based on an input face P that is itself transformed into a caricatured representation Q. That is to say, there is no suggestion in Fujiwara² that the input face P forms even a partial basis for a caricatured representation Q and that the same input face P is also used for updating a mean face S. Thus, Fujiwara² does not disclose “processing means arranged in use to generate a caricatured image representation of the new subject and replacement caricatured image representations of the subjects in dependence on the stored image representations thereof and the received image representation of the new subject” as required by applicants’ claim 12.

Furthermore, while Fujiwara² does calculate a mean image S based on a plurality of images from a facial database (see section 4.1), Fujiwara² does not actually generate any caricatures of these same images that are used for calculating the mean image S as required in the applicants’ claims. For example, in claim 12, the processing means is arranged to “generate a caricatured image representation of the new subject and replacement caricatured image representations of the subjects in dependence on the stored image representations thereof and the received image representation of the new subject,” which Fujiwara² does not teach.

This combination of features that have been identified as being novel in applicants’ claim 12 over Fujiwara² combine in an inventive manner to provide maximally distinguishable caricatures (see page 10, lines 17-22 and page 12, lines 15-19 of the present application). This is based on calculating a mean face (used for

David John CHATTING, *et al.*
Serial No. 10/585,785
June 11, 2009

generating the individual caricatures) using the faces in the group (i.e., a closed group system). Fujiwara² does not suggest such an approach, nor would a skilled person be motivated to modify Fujiwara² to do so inasmuch as Fujiwara² is simply aimed at obtaining the best caricature from a single input face for its particular matched AM, and is not related to producing multiple maximally distinguishable caricatures within a group.

Regarding dependent claim 13, it is noted that this limitation has now been incorporated into independent claim 12. As will be appreciated, in context (i.e., when the claim is considered “as a whole” as it must be under 35 U.S.C. §103), merely creating a caricatured image representation of a new subject is insufficient. Dependent claim 13 (and claim 12 as now amended) require the generation of a caricatured image representation of a new subject and replacement caricatured image representations of the subjects earlier recited in claim 12 as having stored image representations, in dependence on the stored image representations thereof and the received image representation of the new subject. Clearly, no possible combination of the Fujiwara references teaches or suggests such a feature.

Regarding dependent claims 14-18, the Examiner continues to make assertions that are not supported by the teachings or suggestions of the Fujiwara references. However, in view of the already discussed fundamental deficiencies of both these references with respect to parent claim 12, it is not believed necessary at this time to give detailed discussion of further deficiencies. Suffice it to note that, as a matter of

David John CHATting, *et al.*
Serial No. 10/585,785
June 11, 2009

law, it is impossible to support even a *prima facie* case of “obviousness” unless the cited prior art teaches or suggests each and every feature of the rejected claims.

Regarding independent claims 2 and 6 and dependent claims 3-5, 7, 8, 17 and 18, the Examiner merely relies upon prior discussion of the Fujiwara references. Similarly, the applicants rely upon the above-noted fundamental deficiencies of these references.

Regarding independent claim 19, the Examiner again merely relies upon earlier comments made with respect to independent claim 12. The Examiner also now asserts that Fujiwara teaches a system which displays a replacement set of caricatured second facial images to represent a new group of persons now including the new person, etc., and relies upon Fujiwara¹ at page 153, Fig. 2. However, as a reading of this reference will clearly indicate, there is first of all no teaching that the actual system displays what is depicted in Fig. 2 to explain that different caricatures of a single input image P result when that image is caricatured *vis-à-vis* a mean face S in a first instance and a mean face S' in a second instance. Furthermore, there is no new “person” nor any new “group of persons” for which a new replacement set of caricatured second facial images is generated or displayed, etc. Instead, Fig. 2 merely illustrates a fundamental fact that a caricature differs depending upon the particular selected mean image to which it is compared for the purpose of caricature.

David John CHATTING, *et al.*
Serial No. 10/585,785
June 11, 2009

With respect to dependent claim 20, the Examiner admits that Fujiwara fails to disclose caricature weighting which increases as the number of persons included in a group. The weight factor “b” used in Fujiwara¹ at formula 1 is not explained, but in any event, it does not appear to have anything to do with a number of persons involved in any group.

To supply this admitted deficiency, the Examiner relies upon Fujiwara because the latter teaches that a mean face changes as a function of age. The Examiner then argues that it would have been obvious to adjust a mean face based on age – which does not have any necessary relationship of course to the number of images in a group. The Examiner strains the asserted logic even further by asserting that somehow the claimed weighting factor associated with a new image representation “generally increases with time.” It is not clear whether the Examiner is asserting that the five-year age groups of Fujiwara² are somehow necessarily related to the number of images used in the database for creating any given mean facial image S. In any event, the Examiner’s comments do not appear to be logical – or even particularly related to the claimed subject matter – even after the above amendment of claim 20 to require that the caricature weighting factor increases as a function of time from receipt of a new first facial image. To the extent that either of the Fujiwara references have any relevance, they would appear to teach directly contrary to this claimed subject matter.

David John CHATTING, *et al.*
Serial No. 10/585,785
June 11, 2009


With respect to dependent claim 21, the Examiner relies upon earlier comments – and again makes assertions that are not actually supported by Fujiwara¹.

With respect to dependent claim 22, the Examiner makes no further substantive comment.

There being no other outstanding issues, it is believed that this entire application is now in condition for allowance, and a formal notice to that effect is earnestly solicited.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: 
Larry S. Nixon
Reg. No. 25,640

LSN:lef

901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100